City Environment: Natural and Built

Issue Paper Discussion
City of Rockville, Maryland

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Table of Contents

City of Rockville
Zoning Ordinance Revision
Issue Paper

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PART ONE – INTRODUCTION

I. INTRODUCTION

The term "environment" can include two concerns – the natural surroundings of a community (air, water, wildlife, trees, etc.) and the built surroundings that influence a person's experience within a certain area (signage, vibrations, lighting, building appearance, etc.). Development affects the two spheres of the environment– natural and built. The clearing, grading, and excavation work involved in land development can have obvious impacts on the natural environment. In addition, development can create noise, shadows, and traffic which can have an adverse impact or nearby residents and workers. Regulations are placed on the natural environment to protect and enhance the natural world. Similarly, regulations are placed on the built environment to eliminate or mitigate the results of man-made activities and structures.

Sometimes the concerns of the natural and built environment work in opposition to each other and require a choice from among competing policies. For instance, the development of a large apartment building with the associated requirements with that development (sidewalks, building envelope, and parking standards) often means the destruction of trees. Developing the site and preserving existing trees or forest may not be possible under the existing Zoning Ordinance and Forest and Tree Preservation Ordinance. Tree replacement may be the only current alternative under those two ordinances. Where there are competing policy decisions, the City's Code should provide direction for necessary decisions. The Zoning Ordinance, however, only controls certain environmental issues (primarily the built environment concerns) *to the extent they are related to the impact of development*. Control of other policy decisions must rely on other City, County, State, and Federal regulations.

Although staff has reviewed a number of environmental issues, only a handful of those issues are appropriately addressed in a Zoning Ordinance. Issues that are not within the scope of Zoning Ordinance, but which the Mayor and Council would like to address, should be considered through change to other regulations. Staff is seeking Mayor and Council's approval to continue to develop *zoning* regulations related to the City's environment, which will include the following:

1. **Parks –** Continue to support the recommendations of the Green Requirement paper to require a specified amount / type of parkland with each new planned development. Place existing parkland / open space in the City in a planned development zone which would require dedication of parkland / open space if ever built out.

2. **Landscaping, Screening, and Tree Cover** – Continue to support the recommendations of the Green Requirement paper to increase the landscaping standards of the ordinance through increased requirements in parking lots, on site tree cover, and additional standards in a landscaping / screening design manual.

3. **External Lighting** – Provide regulations or guidelines on the types, location, and angles of external, electrical lighting in the Zoning Ordinance.

4. **Shadows** – Examine the current shadow regulations (cast from buildings) in the Town Center Zone development standards and determine if these standards are adequate and suitable, and if they should be extended to other zones.

5. **Signs** – Create a special task force (separate from the Representatives of Rockville Zoning Ordinance Review Committee) to review the sign section of the ordinance.

6. **LEED or Alternative Green Building Standards** – Consider including meeting LEED or other green building requirements established by the City as an amenity to the City for the Amenity Development Option in return for development adjustments such as density bonuses. In addition, or in the alternative, consider adoption of green building requirements ordinance, separate from the Zoning Ordinance, to be incorporated in the City Code.

7. **Vibration** – Consider vibration requirements for individual uses as a performance standard in the Zoning Ordinance to limit the impact of certain uses on residential neighbors.

II. AUTHORITY OF ZONING TO CONTROL THE ENVIRONMENT

A. **Natural Environment** – Concerns of the natural environmental are generally regulated by Federal laws, which delegate authority (enabling authority) to the states to implement. The states then delegate some of the particular implementation authority to the local jurisdictions (counties and cities). The issues associated in these regulations are large-scale, multi-jurisdictional impact issues that cross incorporation boundaries (air, water, etc.). While the City may provide stricter standards than required by the Federal or State laws, the City may not have less strict standards. Where leeway is provided within the wording of the regulation, the City may adopt policies on how to implement the requirements, so long as the goals and requirements of the Federal and State legislation are carried out.

The authority granted to the City to control many of these natural environmental issues is specified in separate sections of the City Code (outside the Zoning Ordinance) which address individual topics. Specifically excluded from the zoning powers of the City is any regulation that is not otherwise granted to the City by any other state enabling law, or any regulation which is granted to the City but which is required to be addressed in another section of the City's code. Many of the natural environmental issues would fall into this zoning exclusion.

B. Built Environment - The built environment is often controlled at the local level. In Maryland, municipalities are permitted to adopt Zoning Ordinances only within the permitted authority of the enabling legislation, Article 66B of the Maryland Code. While the purposes of zoning outlined in 66B include provisions to conserve natural resources and to prevent environmental pollution, the specific types of regulations in a zoning code to achieve those goals are limited to height of stories; percentages of lots to be occupied; parking for cars and bicycles; size of yards and other open spaces; density, location, and use of buildings, signs, and structures. A City may impose additional restrictions, conditions, or limitations in a Zoning Ordinance that are considered appropriate to preserve, improve, or protect the general character and design of the land and improvements (buildings/structures/etc.) thereon, and of the surrounding or adjacent lands and improvements. In relation to that purpose, a city may have or reserve the power to approve or disapprove the design of buildings, construction, or landscaping within the Zoning Ordinance.

To achieve the goals and to implement the types of control authorized in a Zoning Ordinance, different communities use different regulatory schemes. As has been discussed in different White Papers, some communities may:

1. Use base district regulations (requiring the same types of regulations for all development within a certain district),
2. Provide more flexibility with special development procedures (allowing alternative development requirements for a large-scale project),
3. Include overlay districts (providing specific regulations for certain areas of a district),
4. Include amenity development options (negotiating for the types of development on a case by case basis);
5. Focus primarily on the uses allowed within each district (Euclidean Zoning),
6. Focus on the form of buildings to be developed (Form Based Zoning), and/or
7. Emphasize the performance of uses within buildings and their affect on their surroundings (Performance Zoning).

Performance zoning requirements are often used as environmental regulations in a Zoning Ordinance because they require buildings or facilities to be constructed and operated so as not to create any offensive, noxious, objectionable, or otherwise undesirable effects on persons or property outside of the lot line. Performance zoning thus typically regulates aspects of a site that may have an affect upon surrounding properties such as noise, vibration, air emissions (pollution, particulate matter, smoke, dust or odors), liquid discharges

(unpermitted or via stormwater runoff), external lighting, glare, heat, electrical disturbance (electromagnetic or radio frequency), radioactivity and toxic, flammable and explosive materials and hazardous waste.

III. ROCKVILLE'S ENVIRONMENTAL GUIDELINES

Zoning Ordinances have a state mandated amendment process that is more demanding than other code amendments. Many communities provide their technical standards outside the Zoning Ordinance because they are easier to modify when they require improvements. These standards are often referenced, and sometimes mandated for compliance, within the Zoning Ordinance. It is the language of the Zoning Ordinance which determines whether these technical standards must be complied with or whether they must only be considered, regardless of whether these standards are called "guidelines," "standards," a "manual," etc.

The City adopted Environmental Guidelines in July 1999 that provide guidance on siting issues by recommending appropriate stream and wetland buffers, unsafe and unsuitable land protection, protection of rare, threatened and endangered species, noise and light abatement, and other environmental issues. The City may want to consider strengthening and expanding some or all of these guidelines by making them separate ordinances, apart from zoning, such as an energy efficiency / green building ordinance.

There are a number of environmental performance regulations/standards already incorporated in some way into the current zoning regulations or provided in other areas of City government (othe chapters of the City Code, guidelines, manuals, etc.). Given that Rockville is nearly "built out," future land use and development activities will largely fall into the redevelopment category. The City's 2002 Comprehensive Master Plan, the Forest and Tree Preservation Ordinance, the Sediment Control and Stormwater Management Ordinance, Floodplain Management Ordinance, and the adopted Environmental Guidelines contain multiple recommendations for protection and preservation of existing natural resources during land development and redevelopment activities. These policies focus on:

- Implementation of strategies to protect existing forest areas, including stands of mature trees on development sites.
- Protection of streams, wetlands, steep slopes and other watershed features.
- Preservation and enhancement of stream and wetland vegetative buffers.
- Rehabilitation of degraded watershed elements as part of development activities.
- Use of the latest best management practices for treating and controlling stormwater runoff.
- Use of innovative strategies to minimize area of impervious surfaces.
- Implementation of comprehensive watershed management strategies.
- Restriction of development activities in the 100-year floodplain.
- Requirements to reforest when forest clearing cannot be avoided, and afforest when forest cover is not initially present.

- Requirements to replace significant trees when individual tree removal occurs (however, at this time we do not have the authority to require a minimum amount of tree preservation)
- Requiring developers to eradicate all plants on their sites listed by the MD Dept of Natural Resources as exotic invasive species (though this is only a verbal policy and not an ordinance requirement).

IV. COMPETING ISSUES OF ENVIRONMENT AND DEVELOPMENT

Environmental initiatives often involve competing and/or conflicting goals and values. Most cities were founded in locations where nature offered various attractions (waterways, attractive scenery, etc.). As cities have grown they have had to balance the benefits of the built environment with the interests of the natural environment that originally encouraged the development in that location. The conflicts of economic development and its attendant environmental impacts with the amenities of a city are some of the most debated issues in a community. How each community resolves those conflicts is what makes each community unique.

The reduction of pollution increases the quality of life of a community. Pollution can be defined as anything that results in an undesirable change in the natural environment as a consequence of human activities. It is easy to see sources of potential pollution all around us, from car exhaust and oil leaks to general litter and improper pet waste disposal. There are other types of pollution that may be less obvious: excess lighting spilling across property lines or improperly directed skywards; noise from industrial activities or traffic; even excess heat radiated from asphalt parking lots. Federal and state laws have mandated maximum acceptable levels for some types of pollutants. Requiring higher standards is a policy choice for the City.

The provisions of certain amenities provided by the City to its citizens also create the quality of life. The use of Rockville's parkland is a policy decision for the Mayor and Council. Balancing the need for active and passive recreational areas; with forest, wetland and stream conservation areas; and with stormwater management areas is challenging. Each use provides a valuable amenity or resource to Rockville's residents. In some cases the community's need for additional active recreation facilities outweigh negative impacts on the natural environment. Such was the case for the Twinbrook Recreation Building. In other cases, the need for active management on stormwater may outweigh the need for passive open space. Such was the case in Mount Vernon Stream Valley Park.

The City also determines the environmental policy to use a growing-not-mowing protocol to benefit riparian and wildlife habitat. The City's co-existence with wildlife policy allows beavers to cut down trees in the City's Forest Preserve Parks, and deer to damage newly planted trees and shrubs and homeowner's gardens. This leads some citizens to demand their removal while other citizens strongly favor protection of all wildlife in our urbanizing environment. Citizens desire well-lit streets and shopping areas for safety, while others decry the loss of our star-filled skies. These conflicts create challenges for elected officials, City staff and citizens in developing policies and in making and enforcing regulatory decisions.

PART TWO – WHO CONTROLS WHAT?

There are many types of environmental concerns of a City. As discussed earlier, there are natural environmental concerns – air, water, energy, etc. as well as concerns of the built environment – shadows, vibrations, noise, etc. Primarily, a Zoning Ordinance only regulates the built environment while federal and state regulations control the natural environment because these issues often cross jurisdictions and are not often limited to the boundaries of a city; however, The Zoning Ordinance, however, can have indirect impacts on the natural environment. The following is a list of environmental concerns and the primary responsible government authority.

I. FEDERAL AND STATE CONTROLLED ENVIRONMENTAL ISSUES

In addition to the environmental guidelines (discussed on page 4), and the recommended revisions to the Zoning Ordinance later in this paper, there are other environmental concerns of a community. The following is a brief discussion of the federally and state controlled regulations. While the City may impose stronger regulations than the federal or state government imposes, currently only the Forest Tree Preservation Ordinance[1] and the Stormwater Management Ordinance[2] has stricter standards. It is the general recommendation of this paper, not to impose stricter standards than federal or state standards on other issues listed below.

A. **Air Quality** – Air quality regulations are established by the federal standards for emission, which apply to the state. Management of overall air quality is a regional challenge since atmospheric pollutants travel long distances and across geographical boundaries. Transportation-derived exhaust emissions make up a considerable percentage of air pollutants. Due to their inherently mobile nature, transportation-derived air pollutants are best regulated at the Federal or State level.

Local governments may have an impact on air quality indirectly through some of the policies they adopt. For instance, local governments can subsidize mass transit use, encourage their employees to telecommute, carpool, and provide priority parking (for vehicles with more than one occupant) – trying to get less people using their cars. In support of such policies the Zoning Ordinance can have an indirect impact on the air quality by encouraging home based businesses, live-work developments, and other design elements which encourage transit accessibility and walkability and which have been discussed in previous white papers.

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[1] The Forest Tree Preservation Ordinance is stricter in three items: 1) The FTPO requires replacement for removal of significant trees in addition to afforestation/reforestation. Significant trees are defined as 12 inch or greater dbh (diameter at breast height) outside of forest areas and 24 in dbh or greater within a forest. The State (and most other municipalities) does not have this requirement. 2) The FTPO requires reforestation for clearing forest below the conservation threshold at three-times the amount of clearing. The State requires reforestation for clearing below the conservation threshold at two-times the amount of clearing. 3) The FTPO regulates residential lots less than an acre in size, if there was not a house previously on the lot, for protection and replacement of significant trees.

[2] The City's stormwater management ordinance is stricter in that the state does not require stormwater management standards to be met in redevelopment, only for new development. The City, however, requires compliance with state stormwater standards for both new and redevelopment.

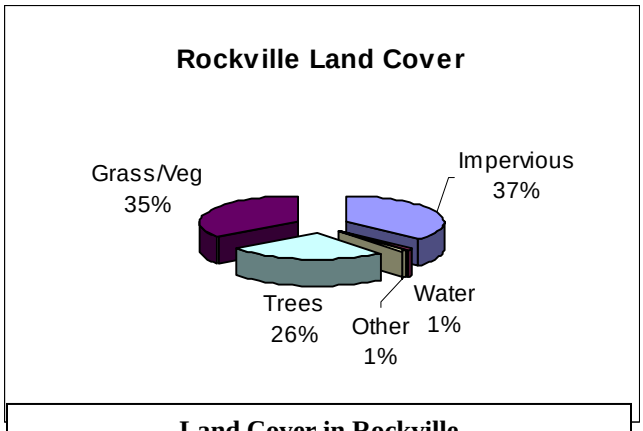
B. Hazardous Waste and Spills- The use, generation, transportation and disposal of hazardous materials is regulated by the Federal Resource Conservation and Recovery Act (RCRA) and administered in Maryland by the Maryland Department of the Environment. Generators of hazardous materials must be permitted, and must follow a strict "cradle-to-grave" manifest system. The City relies on State and Federal agencies for the tracking and reporting of these facilities.

The City is frequently the "first responder" to many spills or accidental releases of oil, gasoline, sanitary sewage, or other chemicals that occur within the City. While not a zoning issue, the City should develop a written Emergency Response Guide to formalize hazardous materials response procedures.

C. Forest and Tree Preservation and Conservation – The state of Maryland has adopted a number of forest-related laws. In particular, any application for a subdivision, grading permit or sediment control permit on areas 40,000 square feet or greater is subject to the requirements of the state's Forest Conservation Act. This act provides guidelines for the amount of forestland retained or planted after the completion of development projects. These guidelines vary for each development site and are based on land-use categories. In response to that law, the City has a Forest and Tree Preservation Ordinance (FTPO) that, as stated in footnote 1 above, has some stricter provisions than the state requires.

In addition, state law has been adopted regarding the proper care and protection of roadside trees to ensure their compatibility with an efficient and dependable public utility system.

The Mayor and Council have expressed an interest in strengthening the City's Forest and Tree Preservation Ordinance to help retain existing trees in the City and increase tree replacement requirements on site. In commercial areas, in particular, the permitted density, building envelope requirements, allowable FARs, building footprints, maximum lot coverage allowances, and parking lot requirements allow for virtually 100% lot coverage during development. Where a development is allowed to build over an entire lot, without additional incentives or lacking additional requirements for tree cover, many developers will remove existing trees and meet re-forestation requirements as necessary off-site. Off-site replacement of trees, however, is becoming increasingly difficult to do because there are fewer planting sites.



Land Cover in Rockville

The Maryland Department of Natural Resources reports that nearly all of Maryland was forested when Lord Calvert founded St. Mary's City in 1634. Today the forests only cover about 44% (2.8 million acres) of Maryland. In November of 2002 the Maryland Department of Natural Resources published the following table representing Rockville land cover. Other estimates put impervious surface coverage in the City at 32%.

New street trees help compensate for the removal of existing trees, however, limited planting space, limited right of way widths and building envelope requirements (especially with zero setbacks) dramatically impact and reduce the ultimate canopy size of street trees at the current time. Consequently, trees grown under these conditions, while they still provide a significant environmental benefit, will contribute far less to reducing heat island effects, reducing stormwater runoff, and reducing air pollution than trees given adequate space to grow and mature. Setting aside small public park areas within the high-density development areas might be one way to preserve some small diameter, young trees if the overall plan can accommodate the park area(s). Preserving large mature trees however, requires very large critical root zone preservation areas, which can be extremely problematic given current zoning allowances.

While commercial and industrial districts display the most obvious conflict between economic development and tree preservation, the issue extends to residential areas as well. Areas where new subdivisions are proposed can sometimes be planned around some tree preservation areas through cluster or PRU provisions that allow lot size and location flexibility. However, in cases where there exist older lots that are either undeveloped or proposed for additions or redevelopment, conflicts between property rights and tree preservation are likely. If a homeowner wishes to build or add on to a house, and the only feasible location will require removal of significant trees, is the City willing to deny or limit the ability to build the addition?

D. Stormwater Management – Stormwater management (SWM) requirements for a City are set out in state law and City code. The City makes certain policy decisions with regard to SWM, such as where to locate facilities, the types of facilities and acceptable SWM alternatives, in addition they can and do exceed state standards (by requiring compliance for both new development and redevelopment). SWM has three separate components: 1) to improve the quality of stormwater (by reducing pollutants); 2) to reduce downstream erosion (by reducing the flow rate of smaller, frequent storm flows); and 3) to reduce flooding (by reducing the flow rate of larger, less frequent storm flows). Stormwater management (SWM) structures are designed to collect and attenuate rainfall in order to separate pollutants that are collected as rain passes over impervious surfaces and to reduce the energy of collected runoff to protect receiving streams from erosion. Today, the City requires all new development and redevelopment to meet State of Maryland Design Manual for water quality and quantity treatment. The City's Stormwater Management law (Chapter 19 of the City Code) and the Department of Public Work's Stormwater Management Regulations describe the requirements for new development, which is administered through the City's development review and permitting process. The City's stormwater requirements are stricter than the state requires, as stated in footnote 2.

To improve Rockville's stream and water resources, Rockville developed a regional SWM program in the late 1970's. Because such a large amount of land was developed without the benefit of SWM in the City, Rockville's streams will continue to degrade unless a regional approach to SWM is employed. Rockville performs watershed studies to develop watershed goals, identify problems and prioritize improvements.

Traditionally, the improvements have focused on SWM facilities and stream restoration projects. Taking into account State and Federal guidance for wetland disturbance and a general prohibition on "in-line" ponds, the location of public regional stormwater management facilities is a policy decision of the City. In Rockville, some of these facilities are located or are proposed to be located in City parks, reducing somewhat the land available for active and passive recreation amenities.

In relation to the Zoning Ordinance, there have been a number of recommendations that will reduce the impact of impervious surfaces. The City is approximately 35% impervious when taken as a whole (a more exact figure will be calculated when the stormwater utility study is finished). This figure is fairly average for a suburban area in this country. Urban areas, however, like D.C., are more impervious (ranging somewhere around 50-60% impervious).

For residential districts, the Green Requirements paper recommended providing a vegetative covering requirement (now to be applied on both the front and rear yards) and a main building lot coverage limitation. The Parking issue paper recommended both increasing the parking lot landscaping requirements and not requiring an entire parking lot to be paved until demonstrated that there is a need for 100% of the minimum spaces. The amenity development option also provides an opportunity for the use of more pervious surfaces for different surfaces.

One area where of stormwater management additional review may be necessary is within the property maintenance code, with regard to lot-to-lot runoff. The current language is not as strong as the City would like to restrict residential run-off into other yards. While the City does cite citizens for noncompliance, the problem in most situations stems from the original grading.

Currently, it is expected that commercial and industrial areas will have a high degree of impervious surface area. This is usually addressed with underground stormwater management areas where feasible, and conveying additional runoff to regional stormwater management facilities elsewhere in the City. The trade-offs between desired densities and lack of tree cover preservation and replacement need to be considered in the context of the Master Plan.

E. Wetlands - By definition, a wetland is an area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands have many beneficial effects on water quality. As pollutants and nutrients contained in stormwater travel through wetlands, they are gradually absorbed or broken down by vegetation and bacteria and filtered out by the soil. Wetlands also help to reduce the velocity of flowing water that lessens its ability to loosen and carry away soil particles further downstream. In addition, wetlands provide food and habitat for a wide variety of animal life.

Wetlands are not a zoning issue. The federal government (through the Clean Water Act) and the State (the Maryland Department of the Environment or MDE) have jurisdiction

over most wetlands. It is the responsibility of the City to regulate for smaller, isolated (not connected to waterways) wetlands, on a case-by-case basis. The City's Environment Guidelines recommend protection of wetlands that do not fall under the jurisdiction of the U.S. Army Corps of Engineers (U.S. ACOE) or MDE but have potential natural resource value and/or potential functional value through restoration. These sites can assist in offsetting the unavoidable impacts associated with development elsewhere in the City and the County. The Environmental Guidelines recommend wetland buffers ranging from a minimum 25-foot buffer for isolated wetlands up to a 100-foot buffer where adjacent areas contain steep slopes or highly erodible soils.

F. Trash and Recycling – In general, trash and recycling issues are outside of the Zoning Ordinance. The County generally regulates these matters though the state has recycling requirements. However, one area that could be regulated (but not within the Zoning Ordinance) is a requirement for the provision of recycling receptacle areas within multi-family or commercial buildings. Recycling requirements in general should be included within Chapter 20 of the Code, Solid Waste.

II. PRIMARILY COUNTY CONTROLLED ENVIRONMENTAL ISSUES

A. Noise Pollution – Noise negatively affects human health and well-being. Problems related to noise include hearing loss, stress, high blood pressure, sleep loss, distraction and lost productivity, and a general reduction in the quality of life and opportunities for tranquility. There are two basic noise-related conditions that jurisdictions should consider. The first is a noise condition emanating from an individual source or from a proposed use on a single parcel. The second is a noise-existing condition emanating from public or quasi-public facilities such as highways, arterial roads and railroads.

Noise emanating from a single source or use on a property is currently regulated by Montgomery County through their Noise Control Ordinance, which also regulates noise levels in the City. The machinery required to conduct decibel testing can be expensive and would require a dedication of resources by the City that are not necessary, since the County regulates it. As a result, staff has not addressed that environmental performance issue in this paper.

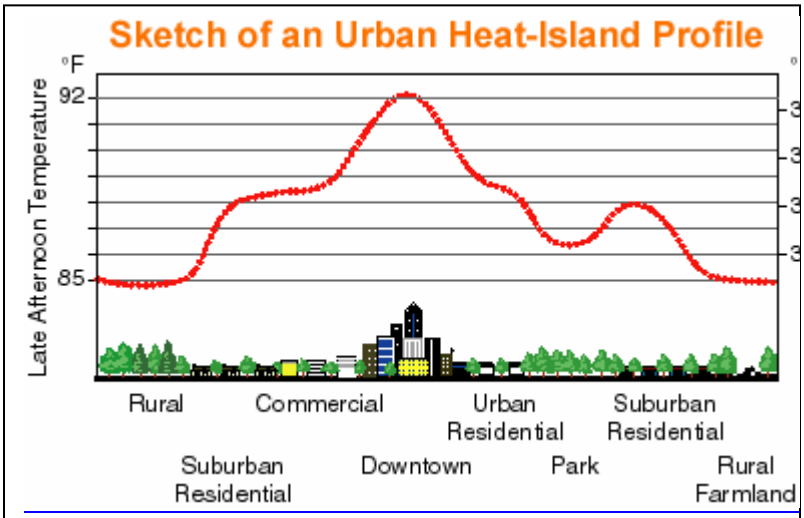
The impact from transportation sources of noise pollution remains largely uncontrolled in most urban areas, in spite of the widespread impact. The Department of Public Works Traffic & Transportation Division, working with the Traffic & Transportation Commission and the Commission on the Environment, is drafting a Comprehensive Transportation Noise Policy to first address noise impacts from traffic emanating from new development or redevelopment. Eventually, Rockville may wish to consider mitigation of existing noise impacts. On April 15, 2005, RK&K (the City's noise consultants) presented a preliminary Transportation Noise Study to the City of Rockville to determine existing transportation noise impacts to all portions of the City. This study could be expanded upon to determine mitigation prioritization of known existing noise transportation noise impacts. Performance standards for noise could be included in the Zoning Ordinance, or the ordinance could make reference to the County's standards.

B. Energy – Montgomery County has established energy programs that provide mostly education of energy saving techniques. The Energy Information Agency of the U.S. Department of Energy projects a 57% worldwide increase in energy demands from 2002 to 2025, with oil demand growing by more than 52% and natural gas by 69% over the same period. Escalating challenges will surely be faced in the cost, availability, and reliability of traditional energy and fuel sources. Both energy conservation and the development of alternative energy sources will become increasingly necessary.

The Zoning Ordinance is not the place for extensive environmental regulations. The Zoning Ordinance should, however, consider some flexibility in regard to energy-saving matters, such as including allowances for items such as rooftop solar collectors, or density credit for green building compliance or LEED certification as part of the Amenity Development Option.

III. PRIMARILY CITY CONTROLLED ENVIRONMENTAL ISSUES

A. Heat Island Effect - As more and more communities are built-out, with hundreds of acres covered by buildings and asphalt covered streets and parking lots, the more cities have noticed the "heat island effect." The rise in hard surfaces and reduction of green space has led to higher temperatures in towns than in the surrounding countryside. On warmer summer days, the air temperature within a city can be 6º to 8ºF higher than the surrounding rural areas. The color of a built environment can increase temperature. Buildings and pavement made of dark materials absorb the sun's rays instead of reflecting them away, causing the temperature of the surfaces and the air around them to rise. In addition, the reduction of shade trees can also increase this phenomenon. Trees, shrubs and other plants shade buildings and parking surfaces, absorb solar radiation, and cool the air by evapotranspiration.



Profile of an Urban Heat Island

In relation to the heat island effect, the Green Requirements and Parking papers recommended increased standards for landscaping in the City. Increased landscaping requirements will ensure that shade trees are provided in tree lawns and in parking lots. The encouragement of "green roofs" by the City would also reduce some of the heat island effect from the built environment.

B. Parkland / Open Space - In managing future development, the Zoning Ordinance and the amendment of other citywide regulations are opportunities to create additional public parkland and open space areas. Rockville has a 50+-year tradition of including neighborhood parks as part of new residential developments. With its nearly 1,000 acres of public parks, grounds and forest areas, Rockville is well above the national average with 18 acres of parkland per each 1,000 residents. This ratio should be maintained and enhanced as a key goal of all future land use decisions.

Currently, there is no official open space requirement, except with the creation of a Planned Residential Unit Development (PRU). Comprehensive Planned Developments (CPD) approvals generally include a condition requiring dedication of land for public parkland including stream valleys and forests. This is consistent with the Master Plan recommendations, which calls for 20% open space dedication with new developments. As discussed in the Green Requirements paper, is the need to require more public parkland / open space there. The standards of parkland/open space (meaning the acreage required, the type of open space to be provided, the fee-in-lieu to be allowed, and the measurement on which to base the requirement such as population of applicable development or number of residences created) are all tied to creating both an environmentally and aesthetically pleasing community. The provisions of open space / parkland may also be a way for certain developments to meet forest conservation requirements.

In the Green Requirements paper, there was a discussion of how other communities have adopted an open space zone and how that zone operates. Along those lines, a Planned Development Zone could be placed on all existing parkland of a certain size (large enough for future development) and open space (such as golf courses both private and public) which would allow low-impact uses such as parks and open space but would also allow for the future development of only planned developments. As discussed above, it is the intent of the zoning revision to include a more stringent requirement for the dedication of parkland / open space in future planned developments. Currently, these areas are primarily zoned within a residential district, for which there is no parkland / open space dedication requirement. In addition, some of these areas are privately owned. The City cannot make it a requirement of sale for private land to dedicate parkland. The only areas currently required and will be required in the revision to dedicate parkland to the City are planned developments. If these areas are designated as planned developments, then a portion of that land will be guaranteed to be dedicated City parkland.

C. Invasive Exotic Species – Invasive species can be native or non-native (exotic). While there are federal and state lists stating what are invasive species and what are exotic species, there are no general limitations on them. Some invasive exotic species are controlled under state law as “noxious weeds” or through agricultural nuisance law. These species are controlled in the City through the environmental guidelines and as a matter of forest conservation maintenance. A general way to consider them, according to the Maryland Invasive Species Council, an exotic or invasive species is as follows:

"An [exotic invasive] species, also called non-native, non-indigenous, or exotic, is one that is introduced, accidentally or purposefully, into an ecosystem in which it did not evolve. Alien or exotic species can come from other continents, other countries and even other parts of the United States.

Exotic species are not automatically "bad." Most of our important food crops and domesticated animals are exotic. But both exotic and native species (ones that evolved in Maryland) become problems when they are invasive. Invasive species often exhibit certain characteristics: they spread aggressively, reproduce quickly, have short juvenile periods, tolerate a wide range of climatic conditions and habitats, compete efficiently against other species, and thrive in disturbed areas. Unfortunately, the pests and diseases that keep these exotic populations under control in their regions of origin are not present in Maryland. Most of Maryland's invasive species come from somewhere else in the world.

Invasive species cause ecological damage by out competing native species, reducing biological diversity, and changing ecosystem functions such as flood and fire regimes or nutrient cycling. The Asian vine kudzu quickly climbs over trees and shrubs and can kill them by strangling and shading. Some invasive species, like the aggressive stinging red imported fire ant, can present serious human health risks. Invasive species also have major economic consequences, ranging from the loss of economically valuable species to the costs of controlling or managing infestations on public lands. Populations of the predominant forest tree in Maryland, the American chestnut, were decimated by the chestnut blight, an exotic fungus accidentally introduced in the 1880s. The state of Maryland spent 1.8 million dollars in 2000 on activities related to exotic invasive species."

The Green Requirements paper included a recommendation to providing more specification with regard to the particular landscaping guidelines. Included in those guidelines would be to preclude the use of invasive exotic species in new developments.

D. LEED or Alternative Green Building Requirements

In addition to the above policies and initiatives, the City should continue to develop programs to promote energy efficient and environmentally friendly building construction, both for City and privately funded projects. Existing programs such as EPA's *Energy Star* and the Leadership in Energy and Environmental Design (LEED) green building certification program can help provide a framework to guide the creation of Rockville's program.

Above and beyond what the City would like to require as mandatory, the Amenity Development Option can work to encourage new development to meet higher standards of green buildings.

PART THREE – PARTICULAR ENVIRONMENTAL ZONING ISSUES

I. GENERAL ENVIRONMENTAL ZONING CONSIDERATIONS

With each environmental performance standard to be included in the Zoning Ordinance, there are some general considerations to be discussed before placing it in the zoning revision.

A. Location – Many types of performance standards (vibration, noise, etc.) are primarily placed in Industrial districts. This is due, in part, to the fact that industrial districts are often considered the most intrusive types of districts and the most likely to generate the concerns associated with implementing these types of standards. In addition, communities often do not want to place additional requirements on residential uses. Different communities consider mixed use districts differently – some place performance standards on these areas while others do not.

B. Particular v. General Standards – The requirements of these regulations can be either particular, either through a set formula or a number limitation, (for example x vibrations per minute) or general (for example stating that there may not be a perceptible vibration within a defined area). While particular standards require additional costs to enforce (see below), general standards require a subjective interpretation of the standard, which can be difficult to regulate.

C. Cost v. Benefit – Particular regulations provided for certain environmental performance standards require additional equipment, staff time, staff expertise (potentially creating the need for additional training), and/or outside expert resources in order to enforce. The cost of the equipment and staff resources needed to implement a regulation should be weighed in comparison to the benefit each environmental standard can provide to the City. Costs can be deferred through fines for violations; however, further research should be conducted to determine the amount of fines necessary to offset the amount of resources needed. In addition, where no violation is found, the City must absorb the cost of the test.

D. Location of Measurement Point – For many environmental standards, to ensure consistency of the performance requirements, a set location should be provided from which the measurement will be taken. Some communities require the measurement at some point or points along the property line while others may require the measurement be taken near the building.

E. When to Apply – As with other sections of the revision, the question will be raised as to what nonconformities will be created. Currently, the Zoning Ordinance has only limited guidelines for performance standards (such as shadow casting in the Town Center) and the application of these requirements elsewhere will create the potential for many nonconformities. In some communities, these regulations are applied when any new use/building/structure is created /changed. As has been discussed in other papers, the definitions of demolition and alteration, which would be the trigger for the application of these regulations could be reviewed in the revision.

II. EXTERNAL LIGHTING

The world at night is becoming an increasingly brighter place. Outdoor lighting is needed for a community to exist. Lighting provides a sense of safety and security for pedestrians and vehicles at night. The prevalence of low-cost, *high intensity* outdoor lighting, however, has led to large amounts of light being directed up and out – not just down, where it is needed. This excess light, directed where it is not wanted or unnecessary, is known as "light pollution".

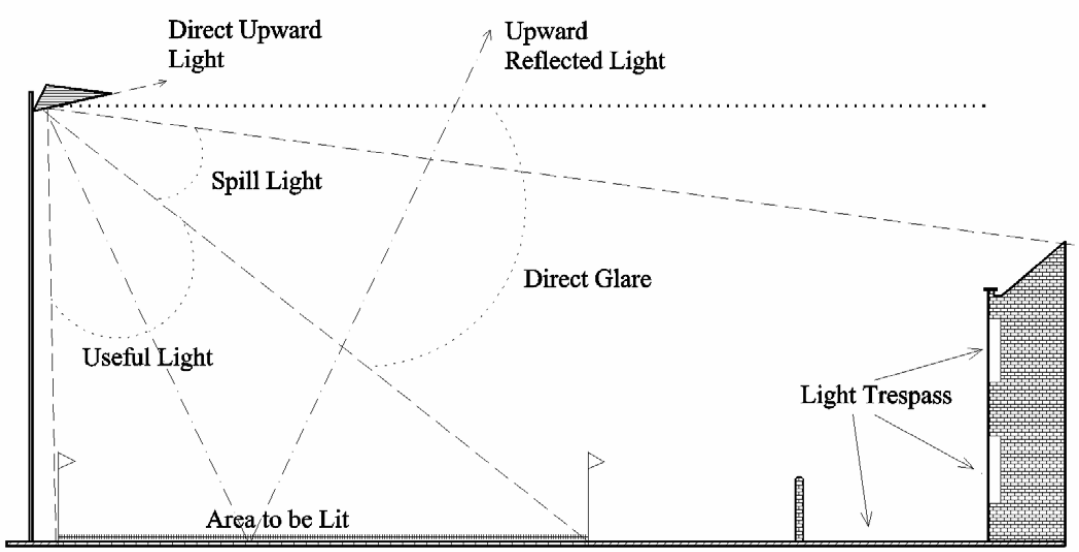
North America at Night

Light pollution generally falls into four categories - light trespass, light clutter, glare and urban sky glow:

1. **Light trespass** occurs when improperly shielded or directed light spills across property lines, producing a nuisance or undesirable condition.

2. **Light clutter** refers to excessive groupings of lights that confuse or distract from obstacles – often times the very things they were intended to illuminate. Improper street lighting and illuminated road signs are the most obvious example of light clutter.

3. **Glare** is associated with directly seeing the filament of an unshielded or badly shielded light – this produces an excessive contrast between bright and dark areas of vision making it difficult for the human eye to adjust to the differences. Glare causes a reduction in night vision and can carry safety consequences when shining directly into the eyes of drivers or pedestrians.



4. **Urban sky glow** refers to the "glow' that can be seen in the night sky over urban areas that obscures from view faint celestial objects such as the Milky Way, nebulae, meteor showers, most stars, etc. Only the moon and the brightest stars and planets are still visible to the naked eye.

In addition to the negative effects listed above, one last major component to light pollution is wasted energy: it has been estimated that the energy to produce all of that wasted light costs over two billion dollars annually in the U.S. alone. Thus for municipalities providing street lighting to large areas, implementing measures to curb light pollution can also save money.

Rockville should consider either drafting an appropriate lighting ordinance, or incorporating lighting requirements and "lighting zones" into the zoning revision process. The goal of the Zoning Ordinance with regard to lighting is to set performance standards, not to limit the types of lighting. These standards, however, would require review of City lights as well which may be a major contributor to light pollution. The Town Center will use different lights from the rest of the City, which will have a cap on top to prevent light spillage from the top. Other areas of the City, however, would have to be reviewed including sports complexes and other recreational lighting, recognizing that these provide popular recreational and leisure opportunities.

Many communities have adopted lighting standards in their Zoning Ordinance. The overarching purpose of these regulations is to establish outdoor lighting standards that reduce the impacts of glare, light trespass and overlighting; promote safety and security; and encourage energy conservation. If incorporated in the zoning revision these standards can be applied to any new development, redevelopment, or only when there is a replacement of any existing lighting fixtures (though merely changing a light bulb may be too little to qualify for a new lighting fixture). Included in these types of regulations can be:

1. Where to place lighting
2. What types of light bulbs are permitted
3. The direction new lighting must be aimed toward
4. Shielding requirements of the lights in certain directions
5. Special regulations for lighting of certain uses (for example, construction sites and outdoor sports facilities); and
6. The amount of footcandles of light to be projected by the bulb in certain uses

III. **SIGNAGE**

Signs can be one of the biggest factors of the built environment. Without proper regulations, signs can dominate the landscape. The intent of the sign regulations within a Zoning Ordinance is to recognize the importance of signs in the community but to balance the importance with the need to protect the public from damage or injury attributable to distractions and obstructions caused by poorly designed or improperly located signs. These regulations are also intended, in part, to stabilize or enhance the overall appearance of the community, and to protect property values. Typical sign regulations regulate the number, size, placement and physical characteristics of signs and sign structures. These regulations are not intended to, and should not restrict limit or control the content of any sign message.

The City of Rockville recently revised the sign article of the Zoning Ordinance in August 2004 to make its provisions content neutral. The existing sign provisions adequately address the concerns of "visual clutter" that signs can create. There is, however, a need to review the sign regulations to ensure that the allowances meet the current needs and desires for signs in the City. Since the revision, new development has begun in the City. In addition, there could be new demands for signs from the proposed zoning changes (for instance, signs posted outside garages displaying the amount of parking spaces available). Town Center, for instance, has used a number of different signs than are currently not included in the Zoning Ordinance. In addition, with the increased emphasis on parking garages, there is a need to review the types of signs allowed to show the availability of spaces within the garage. As a result, a new review of the sign provisions would be appropriate simultaneous with the revision of the larger zoning ordinance.

IV. VIBRATION

Vibration negatively affects human health and well-being. Problems related to vibration include stress, high blood pressure, sleep loss, distraction and lost productivity, and a general reduction in the quality of life and opportunities for tranquility. As a performance regulation, vibration is often controlled as a limitation on the maximum particle velocity. Different velocity standards are generally established for residential and non-residential districts. A sample chart of maximum vibration regulations from York, PA is provided below:

MAXIMUM GROUND TRANSMITTED VIBRATION		
Zoning District	Particle Velocity (inches/seconds)	
	Adjacent Lot Line	Residential District
Residential, Special	0.05	0.02
Commercial, Light Industrial	0.10	0.02
Heavy Industrial	0.20	0.02

Like noise, vibration measurements require special equipment to determine particle velocity. This can be costly. In the alternative, some communities have regulated "perceptible vibrations." This standard, however, is subjective and hard to demonstrate for purposes of enforcement.

V. SHADOWS AND SOLAR ACCESS

A shadow is the circumstance where a building or other built structure blocks the sun from the land. Each community that regulates for shadows must define an adverse shadow impact (because some shadows are considered beneficial). Some consider adverse shadows to occur when the shadow from a proposed project falls on either:

1. A publicly accessible open space,
2. A historic landscape, or other historic resource;
3. A feature or resource that significantly depends on sunlight, or
4. An important natural feature that is adversely affected in its use by a shadow.

In general, shadows on city streets and sidewalks or on other buildings are considered reasonable and expected and are often not regulated in Zoning Ordinances. If the shadow, however, prevents continual access to sunlight at the street level it can affect the use of the street (the sunlight adds warmth and a sense of vitality which enhances the environment of a street), the ability to sustain vegetative life at the street level (which need sun to survive), and in few cases will limit the ability to fuel solar energy sources (particularly rooftop solar collectors).
While solar access is difficult to control in urban areas due to high-density building sizes and tree canopies, tests can be run for new construction to determine where shadows will be cast. If shadows are cast on adjacent properties, limitations on the amount of shadows can be placed in the Zoning Ordinance. In addition, requirements can be included which site new developments on lots in the direction for the most solar access. A shadow demonstration requirement, however, would add an additional burden for the applicant.

Included in the current Town Center guidelines is the requirement that all buildings incorporate elements, which break up facade planes and create a visual play of light and shadow by avoiding long, un-interrupted horizontal elements. In addition, the optional method criteria in Town Center states that "no building shall cast a shadow on existing or approved residential structures between 10:00 am and 2:00 pm on December 21."

VI. RECOMMENDATIONS

A number of staff representatives from different departments have met multiple times to develop the following recommendations.

A. Federal and State Controlled Issues

1. Do not include specific regulations for air quality, hazardous waste and spills, stormwater management, wetlands, and trash and recycling issues discussed in Part Two of this paper in the Zoning Ordinance. Standards for these environmental concerns are best addressed in other sections of the City code. The Zoning Ordinance, however, may indirectly address these concerns.

2. Update the City's Forest and Tree Preservation and Conservation ordinance while ensuring that the zoning update complies with any new standards. In drafting the Zoning Ordinance, the competing values of tree preservation, tree replacement, and development ability should be considered. The flexibility of development provided in the Amenity Development Option might be considered for those sites where designated trees (of a certain size / quality / age) should be preserved. Alternatively, just as stormwater management, minimum provisions for parking spaces and sidewalks are mandated by City ordinances, tree retention (where deemed feasible and appropriate by the City Forester) and tree replacement could be mandated by ordinance as well. Elsewhere, throughout the City, minimum tree cover requirements should be established for newly developed sites. A percentage of on-site replacement should be required because there are practically no receiving sites remaining in the City. Payment in lieu for tree replacement could remain in place because this funding source supports the costs of street tree plantings.

3. Continue to support impervious surface reduction measures presented in other papers. Included in the green requirements paper was a reduction of residential paving ability by requiring 1) main building lot coverage limitations and 2) minimum vegetative yard requirements. Also, within the Parking paper was the proposal to significantly increase landscaping requirements within a parking lot (from .7% to 5% and added tree island requirements). Finally, the Green requirement paper also explained how there needs to be clarification of the definitions of open space / green requirements. Currently hardscaping (sidewalks, patios, etc.) can be considered open space. If the City would like to reduce impervious surfaces, hard surfaces should not be considered part of the open space dedication requirements.

B. **County Controlled Issues**

1. Do not include any noise performance standards in the Zoning Ordinance. As discussed in Part Two of this paper, Montgomery County currently regulates noise emanating from a single source through their Noise Control Ordinance. The machinery required to conduct decibel testing is often expensive and would require a dedication of resources by the City that are not necessary.

C. **City Controlled Issues**

1. To control the heat island effect within the City, increase the standards for landscaping including tree planting and other landscaping within parking lots and along sidewalks through established minimum landscaping requirements. As discussed in the Green Requirements, Parking, and Sidewalks papers, there needs to be an increase in the tree planting and landscaping requirements throughout the City. A separate landscaping design manual should be created and referenced within the Zoning Ordinance, which will outline the particular types of trees, size, and location required. The manual will be maintained outside the ordinance but compliance with the manual will be required in the ordinance. The purpose of maintaining these provisions outside the ordinance is to allow for easier amendments to the standards when they need to be changed.

2. The Recreation and Parks department should complete a Comprehensive Park, Recreation, and Open Space (PROS) Plan and/or consider adaptation of County plan (Attachment 4) for application in the City. As proposed in the Green Requirements paper, more parkland / open space should be required with new development in the City. The standards of what types of parkland / amount / dedication (public or private) should all be provided in the Zoning Ordinance because it relates directly to development requirements. To provide these standards, the City should consider including a parkland dedication matrix; however, a park plan will assist in determining what types of dedications should be required. In the alternative, or in addition to the plan, the 1992 Montgomery County Recreation Guidelines: Guidelines for Recreation Amenities in Residential Developments (Attachment 4) should be used as a model for the City's future dedication matrix (see recommended

supply values). There should be a more defined nexus between the requirements of the Zoning Ordinance and the actual need in the City.

3. Create a Planned Development District that would be placed on all existing parkland of a certain size and other areas of potential "greenfield" development. All existing parkland and open space of a certain size necessary to support a planned development will be classified in the zoning revision as a Planned Development District. As discussed in the Green Requirements paper, one intent of the Zoning Ordinance is to ensure that more parkland is dedicated to the City with future development. If these areas are built-out in the future, they would be required to dedicate a portion of the land as parkland / open space to the City. Currently, as many of these areas are zoned within a residential district, there would be no requirement for parkland dedication to the City.

4. Consider a separate LEED or alternative green building design ordinance and provide standards above and beyond those standards in the Amenity Development Option of the Zoning Ordinance. The Zoning Ordinance is not the place for extensive environmental regulations, such as energy; however, the ordinance should consider allowing development flexibility in return for energy-saving design. This might include allowances for items such as rooftop solar collectors, or density credit for LEED or other alternative green building design certification as part of the Amenity Development Option.

D. **Particular Environmental Zoning Issues**

1. Rockville should consider either drafting an appropriate lighting ordinance or guidelines, or incorporating lighting requirements and "lighting zones" into the zoning revision process. The goal of the Zoning Ordinance with regard to lighting is to set performance standards for safety and other needs, not to limit the types of lighting. These standards, however, would require review of City lights as well, which may be the major violator of light pollution.

2. Review the sign regulations of the Zoning Ordinance separately. Overall, the sign ordinance sufficiently minimizes "visual clutter" that can happen when signs dominate an urban landscape. The types of signs allowed, should be reviewed to ensure that the types of signs the City would like to see are provided for in the ordinance.

3. Consider vibration performance standards for certain uses and in certain districts. There are certain types of uses (for example music store, printing shop, and manufacturing plant) that can cause vibration disturbances off-site. As the Zoning Ordinance is drafted and particular uses are reviewed, staff would like to consider placing a performance standard on vibration that could be deemed to negatively impact neighboring properties. While these disturbances may be considered acceptable in industrial districts, staff would like to consider these limitations in the

proposed mixed-use districts where vibration may be considered a nuisance to surrounding residential uses.

4. Consider shadow regulations in certain areas of the City where shadow casting may be considered a nuisance. Included in the current Town Center guidelines is the requirement that all buildings incorporate elements, which break up facade planes and create a visual play of light and shadow by avoiding long, un-interrupted horizontal elements. In addition, the Rockville Pike plan includes provisions to limit the casting of shadows on existing residential neighborhoods. Additional mixed-use areas of the City, which may be proposed in the revision, should be reviewed to determine if shadow-casting regulations should be applied there as well. The landscaping regulations should be reviewed in association with these standards to ensure that shade trees are not prohibited by shadow-casting regulations in areas of the City where shade trees are particularly desirable.

VII. CONCLUSION

Although there are separate concerns between the natural and built environment, these issues equally affect the quality of a community's environment. As a person walks down a main street, the "sense of place" which they associate with that particular City is created by the impacts on their senses – the quality of the air they smell, the noises they hear, the vibrations they feel, and the things they see such as greenspace, trees and buildings. Most of the natural influences on the senses are controlled outside the City's jurisdiction (by federal and state regulations) because the element is not restricted to jurisdictional boundaries (air, water, forest preservation). Zoning authority for a City, however, allows the City to control many of the aspects of the built environment, and some aspects of the green infrastructure (as it relates to its impact on development).

While a City cannot ignore the natural concerns, the Zoning Ordinance is generally not the vehicle for these regulations. The Zoning Ordinance can, however, indirectly affect nature while regulating development. To the extent the natural world impacts development, the City may control it through zoning. For instance, parkland and open space is considered a natural element. The regulation of providing parkland in planned developments limits the area for development and is, therefore, included in the Zoning Ordinance. Air quality regulations, however, are more appropriately found outside zoning. The policies directing zoning regulations can indirectly affect air quality such as promoting walkable communities, allowing live-work units and home-based businesses.

Sometimes the natural and built environments work in opposition to each other. For instance, lot development may require removing certain trees. It is the responsibility of the City's ordinances to establish policy priorities and to establish and apply alternative methods that balance both priorities

VIII. **ATTACHMENTS**

1. Environment Overview Table
2. Joel A. Tarr, "The City and the Natural Environment," www.gdrc.org/uem/doc-tarr.html.
3. Fairfax, VA Landscaping and Screening Article of Zoning Ordinance
4. Montgomery County Recreation Guidelines: Guidelines for Recreation Amenities in Residential Developments, 1992.
5. Memo to Scott Ullery, from Steve Mader RE: Forest and Tree Preservation Ordinance - Tree Protection Requirements, February 10, 2006.